REMARKS

Claim 9 has been amended in order to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically speaking, Claim 9 now recites that the carbon nanoballoon structure having a hollow portion is oxidized at a temperature of 400-700°C in an oxygen-containing atmosphere. Support for this amendment can be found on specification page 13, lines 14 and 15, of the present specification. No new matter has been added.

A first embodiment of the present invention is directed to a method of producing a carbon nanoballoon structure having a hollow portion which comprises the steps of heating carbon black having a specific surface area of at least 1,000 m^2/g and a primary particle diameter of at least 20 nm to a temperature of at least 2,000°C in an inert gas atmosphere.

A second embodiment of the present invention is directed to a method of producing a carbon nanoballoon structure having a hollow portion and an opening having a diameter of from 0.1-50 nm which extends to the hollow portion and which comprises the steps of heating carbon black having a specific surface area of at least 1,000 m^2/g and a primary particle diameter of at least 20 nm to a temperature of at least 2,000°C in an inert gas atmosphere to form a carbon nanoballoon structure having a hollow portion and oxidizing the carbon nanoballoon structure having a hollow portion at a temperature of from 400-700°C in an oxygen-containing atmosphere to form the carbon nanoballoon structure having a hollow portion and an opening having a diameter of from 0.1-50 nm which extends to the hollow portion.

As discussed in the previous Response, the instant invention provides a method of forming a hollow carbon nanoballoon structure having a relatively large closed space. The carbon nanoballoon structure of the present invention has a graphite outer shell surrounding a hollow portion and

exhibits excellent electrical conductivity, lubricity and chemical resistance and has a high heat-resistance and chemical stability. Since the carbon nanoballoon structure of the present invention is hollow, it also has a low bulk density and excellent insulating properties. The prior art cited by the Examiner does not disclose the presently claimed invention.

The Osawa reference discloses a method for preparing nano-size particulate graphite. This reference discloses that a carbon nano-onion, which is a nano-size particulate, is formed by irradiating soot-like carbon, such as carbon black obtained by incomplete combustion or thermocracking of a carbon-containing compound, with high energy such as electron rays, gamma rays, X-rays or a beam from an ion source. However, the nano-onion obtained by Osawa is not a hollow nanoballoon as required by the present invention but instead is a true sphere-type multi-concentric structure having no cavity therein as shown by Figure 2 of this reference. The Osawa reference shows fullerene black being irradiated with a concentrated electron beam so that a polyhedron-type carbon nano-particle changes to a substantially true sphere-type multi-concentric structure having no cavity. As shown in Column 2, lines 10-15, this product is called a carbon nano-onion. As shown in the Example in this reference, a basic nano-particle having an average diameter of 14 nm was irradiated for 4 minutes with electron rays so that the grape-like aggregate structure composed of irregular spherical nano-particles changed to particulate graphite which is referred to as a "carbon nano-onion" because it is a true sphere as shown in Figure 2. The hollow carbon nanoballoon structure required by the present claims is not shown by this reference.

The hollow carbon nanoballoon structure of the present invention can only be obtained by heating a carbon black having a specific surface area of at least 1,000 m^2/g and a primary particle diameter of at least 20 nm to a temperature of at least 2,000°C in an inert gas atmosphere. Ketjenblack

is the only commercially available carbon black which has a surface area of more than 1,000 m^2/g. The surface area of a furnace black, such as superabrasion furnace black, intermediate superabrasion furnace black and high abrasion furnace black, is small, for example, 100-150 m^2/g. As such, even if furnace black is heated to a temperature of at least 2,000°C in an inert gas atmosphere, only a solid structure is obtained and not a hollow carbon nanoballoon structure as required by the present invention. This is shown in Comparative Examples 1 and 2 of the present specification. The nano-onion of Osawa does not correspond to the hollow carbon nanoballoon required by the present claims. As such, it is respectfully submitted that the Examiner has not even made a showing of prima facie obviousness under 35 USC 103(a) with respect to the presently claimed invention.

Favorable consideration is respectfully solicited.

Respectfully submitted,

Terryence F. Chapman

TFC/smd

FLYNN, THIEL, BOUTELL & TANIS, P.C.
2026 Rambling Road
Kalamazoo, MI 49008-1631
Phone: (269) 381-1156
Fax: (269) 381-5465

Terryence F. Chapman Reg. No. 32 549
Mark L. Maki Reg. No. 36 589
Liane L. Churney Reg. No. 40 694
Brian R. Tumm Reg. No. 36 328
Heon Jekal Reg. No. 64 219
Eugene J. Rath III Reg. No. 42 094
Dale H. Thiel Reg. No. 24 323
David G. Boutell Reg. No. 25 072
Sidney B. Williams, Jr. Reg. No. 24 949

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136.07/05